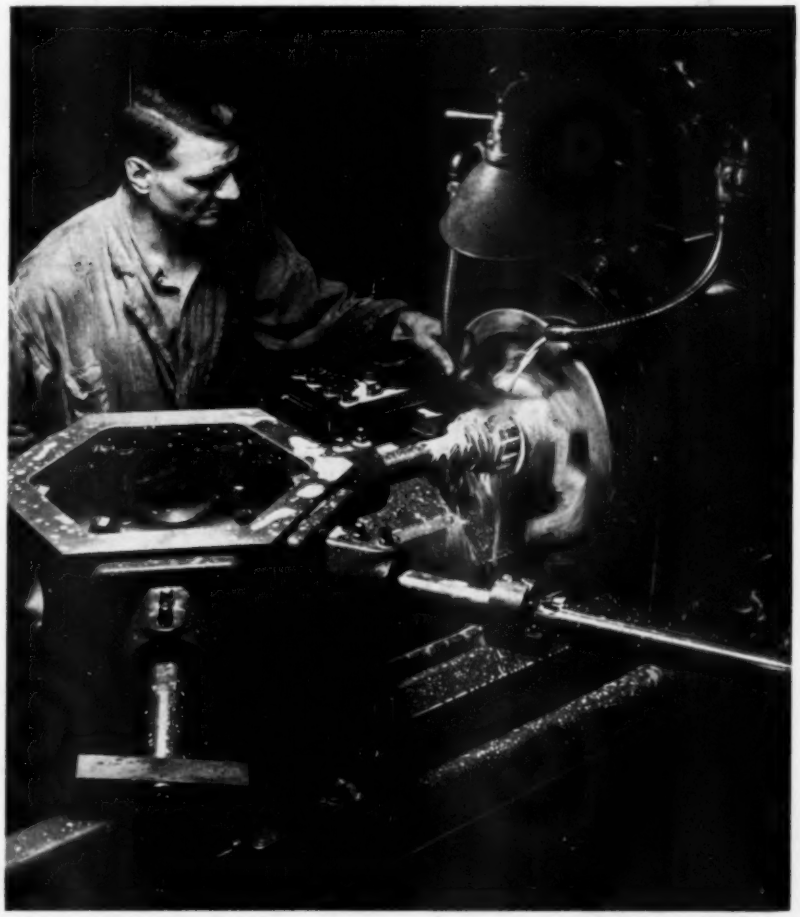
PRICE 15¢

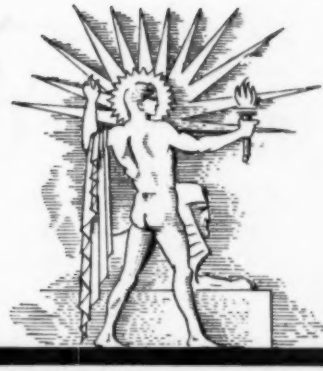
NOLOGY DEPT.

PUBLIC LIBRARY
JUL 16 1940
DETROIT

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





July 13, 1940

For Defense

See Page 19

A SCIENCE SERVICE PUBLICATION

Do You Know?

Seventeen million Americans suffer from *chronic diseases*, says a New York hospital director.

About 15 states now have laws requiring *pedestrians* to walk on the left side of the highway, facing on-coming traffic.

Diabetic patients in England are permitted to swap their sugar ration for an extra allowance of beef.

The dairy industry says that London had *milk bars* 200 years ago—and the cow was kept behind the bar.

The United States produces over 90% of the world's *molybdenum*—important in armaments as a toughener of steel.

A method of sizing paper so that it is *water-proof*, and can even be written on when wet, is being commercialized in this country.

The Bureau of Mines recommends that *detonators* and explosives should not be transported in the same car, and some mining states have safety laws to this effect.

It may yet be proved, says a British anthropologist, that the modern *Arab* is the descendant of the men who built famous ruined cities along the Tigris and Euphrates.

A new *"leaning wheel"* tire is designed to withstand the wear of carrying road-grading machines along, regardless of whether one wheel is high on a bank and the other down a ditch.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

AERONAUTICS

What agency is making books available to aviation students? p. 20.

AERONAUTICS—RADIO

What are the advantages of the omni-directional radio range beacon? p. 29.

AGRICULTURE

What effect will the German invasion of the Island of Jersey have on the American cattle industry? p. 25.

ARCHAEOLOGY

What ancient people used the blitzkrieg and secret weapon techniques? p. 29.

Where was an American "King Tut" discovered? p. 21.

ASTRONOMY

How do Brown University astronomers hope to learn more about the sun's zodiacal light? p. 21.

ENGINEERING

What program is aiding in the training of machine tool operators? p. 19.

GENERAL SCIENCE

How many were listed in England's central register of specialists? p. 20.

What is America's greatest need for defense? p. 19.

Where will Sigma Xi have its headquarters? p. 25.

GEOLOGY

What earth minerals have been made to yield new materials? p. 25.

ICHTHYOLOGY

What is the record for catching broadbill swordfish? p. 24.

INVENTION—RESOURCES

How can the task of transporting chow be made lighter? p. 23.

What industrial material is made from cashew nuts? p. 24.

ORNITHOLOGY

What nine-inch bird has a three-foot tail? p. 24.

PHYTOPATHOLOGY

How can trees afflicted with Dutch elm disease be located? p. 22.

PSYCHOLOGY

Where were two little girls reported to have been brought up by wolves? p. 26.

RESOURCES

How does Germany insure collection of scrap metals? p. 22.

STANDARDS

What change is proposed in the definition for temperature scales? p. 21.

About 18% more land is planted to *soybeans* in the United States this year than last.

Propeller-driven motor *sleds* used in the Finnish army had speeds up to 100 miles an hour.

The name *torpedo* was apparently first used to describe a war invention by Robert Fulton.

A *Sea Gull Monument* in Salt Lake City recalls the California gulls that saved Mormon pioneers from a cricket plague.

The *puffer fish* blows itself up when excited until it resembles a ball with fins and tail.

There are nearly 1,500,000 *Mexicans* in the United States, about half of them living in Texas.

An all-purpose *gas mask* for industrial workers and firemen is said to protect against fumes, smokes, and mists.

Pumping 70 barrels of fuel oil overboard, to *calm* a mountainous sea, saved the American steamer *Antinous* on April 4, in the Pacific.

SCIENCE NEWS LETTER

Vol. 38 JULY 13, 1940 *No. 2*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1940, by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at $3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Henry B. Ward, University of Illinois; Edwin G. Conklin, American Philosophical Society; J. McKeen Cattell, Editor, Science. *Nominated by the National Academy of Sciences:* R. A. Millikan, California Institute of Technology; Harlow Shapley, Harvard College Observatory; William H. Howell, Johns Hopkins University. *Nominated by the National Research Council:* Ross G. Harrison, Yale University; C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry. *Nominated by the Journalistic Profession:* O. W. Riegel, Washington and Lee School of Journalism; A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Baltimore Evening Sun. *Nominated by the E. W. Scripps Estate:* Karl Bickel, E. W. Scripps Co.; Warren S. Thompson, Miami University, Oxford, Ohio; Harry L. Smithton, Cincinnati, Ohio.

Officers—Honorary President: William E. Ritter. *President:* Edwin G. Conklin. *Vice-President and Chairman of Executive Committee:* Harlow Shapley. *Treasurer:* Harry L. Smithton. *Secretary:* Watson Davis.

Staff—Director: Watson Davis. *Writers:* Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, James Stokley. *Photography:* Fremont Davis. *Librarian:* Minna Gill. *Sales and Advertising:* Hallie Jenkins, Austin Winant, Howard Bandy. Correspondents in principal cities and centers of research.

GENERAL SCIENCE

Need American Efficiency In Planning For Defense

Germany's Industrial Techniques Were Largely Made in America; Our Task Now To Outplan All Plans

WITH defense plans progressing speedily in Washington, even if the details necessarily are not too widely broadcast, there is prime need of the application of American-created principles of scientific management to the production for defense and armament.

The airplane used so effectively by Germany was essentially, even as recently developed, an American product in its scientific principles. Efficient organization for industrial planning and accomplishment with machines is American in its roots and finest flower.

With brutal purpose and dictated objectives, the German industrial organization was captured and put to work with deadly results. The irony of it is that the techniques used in German industry were largely made-in-America with the purpose of making men secure and free in their work.

Now America's task is to outplan all other planning, in the words of Wallace Clark of New York, international industrial consultant, who spoke a few days ago at the Stevens Management Conference.

A French writer is quoted as saying that "What the democracies fail to realize is that they are up against planning —not Nazism or totalitarianism but a plan."

A high degree of proficiency is required to set up new producing plants or to change over existing facilities to meet new requirements. But Mr. Clark considers even more difficult the task of setting up a central coordination and control of this vast undertaking.

In this there are four steps, steps that are worth remembering because they are fundamental to doing anything efficiently in this busy world:

1. Securing agreement on what is to be done.
2. Formulating a program.
3. Fixing responsibility and providing the necessary equipment, materials and labor.
4. Carrying out the program in the time allowed.

Science News Letter, July 13, 1940

NATIONAL DEFENSE RESEARCH COMMITTEE

The first meeting of the men who will correlate scientific research on mechanisms of warfare. They are: (seated, left to right) Brig. Gen. G. V. Strong, Dr. James B. Conant, Dr. Vannevar Bush, chairman of the committee, Dr. Richard C. Tolman, vice-chairman, Dr. Frank B. Jewett and (standing) Dr. Karl T. Compton, Dr. Irvin Stewart, secretary to the committee, and Rear Admiral Harold G. Bowen. Also on the committee is Commissioner of Patents Conway P. Coe.

GENERAL SCIENCE

Army, Navy Take Part In Defense Research

BRIG. GEN. G. V. Strong, assistant chief of staff of the Army, and Rear Admiral Harold G. Bowen, director of the Naval Research Laboratory, Anacostia, D. C., are the representatives of the War and Navy Departments upon the newly-created National Defense Research Committee charged by President Roosevelt with correlating and supporting "scientific research on the mechanisms and devices of warfare."

Dr. Richard C. Tolman of the California Institute of Technology was elected vice-chairman of the new committee at its first meeting, and Dr. Irvin Stewart, former Federal Communications Commissioner and chairman of the Committee on Scientific Aids to Learning, was made secretary.

Adoption of a resolution asking the cooperation of the National Academy of Sciences and the National Research Council in carrying out the duties of the committee was announced by Dr. Vannevar Bush, chairman of the committee and president of the Carnegie Institution of Washington. Other committee members are: President Karl T. Compton of Massachusetts Institute of Technology, President James B. Conant of Harvard University, Dr. Frank B. Jewett, president of the National Academy of Sciences, and Commissioner of Patents Conway P. Coe.

Science News Letter, July 13, 1940

ENGINEERING

Launch Education Program On Use of Turret Lathes

See Front Cover

THE BOTTLENECK in industrial production about war or peace supplies occurs in machine tools and the men to run them. It takes a long time to train a good machinist. Any aid in training of apprentices or increasing the skill of experienced operators will help America's rearmament program.

Although better known to the general public as builders of telescopes, the Warner & Swasey Company of Cleveland

builds many of America's machine tools, particularly lathes. They have just launched an effort to help in making the nation's 55,000 turret lathes more useful by furnishing lecturers, textbooks and a monthly journal to all such machinists. An illustration from a textbook appears on the front cover of this week's SCIENCE NEWS LETTER.

Turret lathes combine all the features of the ordinary lathes with tooling equipment which makes possible production of duplicate parts in quantity. It is a paradox that whenever the metal working industries reach a high level of operation it is impossible to find enough properly trained skilled mechanics although millions of men are looking for work.

Science News Letter, July 13, 1940

GENERAL SCIENCE

American Research Leaders Reviewing British Experience

Nearly a Thousand Names in Britain's Central Register Of Specialists; Plan Now Receiving Study Here

OVER a year ago Great Britain's Ministry of Labor created a list of Englishmen whose scientific, technical and professional qualifications would be particularly valuable in time of war.

Nearly a hundred thousand names were contained in the central register of specialists, as it was called, and about a tenth of these were those capable of engaging in scientific research. Enrollment on the register was not compulsory but voluntary.

When war came to England, both the government and essential industries turned to the register to obtain competent and qualified additions to the staff. As war produced dislocations, those who lost jobs were able to find others through being listed on the register.

In some cases certain kinds of scientists, such as biologists, whose primary talents were not of immediate and direct aid to the military preparations, were put to tasks in which they previously had had merely a hobby or secondary interest.

While there are some kinds of experts for which there was a demand far beyond the supply, the disorganization of the early months of the war created a large amount of unemployment among scientists, particularly biologists and chemists, who were connected with educational, industrial and governmental laboratories in which work not connected with the war was severely curtailed.

For this reason, shortly before Hitler invaded Holland and Belgium, scientists were allowed to enlist in any of the British military forces in any capacity, whereas at the beginning of the war specialists and experts could serve only in the particular occupation in which they were proficient.

Those organizing American research efforts directed toward national defense are known to be reviewing British experience with such mobilization of scientific skill and brains. Prof. A. V. Hill, secretary of the Royal Society, who was chairman of the scientific committee cooperating with the central register of specialists in London was in the United States for several months this spring and conferred with American scientists.

Science News Letter, July 13, 1940

ELECTRIC SWITCHING LOCOMOTIVES

The current is supplied by their own Diesel power plants. They are now available in two sizes—660- and 1,000-horsepower, designed for at least 8,000 hours per year of operation, with speeds up to 35 miles per hour. Even more powerful, intended for transcontinental freight service, are the 5,400-horsepower Diesel-electric locomotives recently made for a western railroad.

AERONAUTICS

Lending Library to Speed Aviation Progress

TO SPEED aeronautical defense developments, the Institute of the Aeronautical Sciences is establishing a book-lending service available to aeronautical engineers, pilots and students, Maj. Lester D. Gardner, executive vice-president, has announced.

Over 2,000 aeronautical books will be available for distribution by mail and over 100,000 books on general engineering can also be borrowed through an arrangement with the Engineering Societies Library. The Institute, located at Rockefeller Center, also has a reference library of over 10,000 aeronautical books.

The new aeronautical literature lending service, which will include reviews of new books and digests from aeronautical journals, was made possible by an endowment of $50,000 by Paul Kollsman of New York City and Greenwich, Conn., and the Square D Company of Detroit. Mr. Kollsman is known in aviation circles as a manufacturer of precision aeronautical instruments, most used of which is the sensitive altimeter which gives altitude within five feet.

Science News Letter, July 13, 1940

ASTRONOMY

Brown University Astronomer To Study Zodiacal Light

Photographs To Be Taken on Expedition to Eclipse Of Sun in South America On Next October 1

PHOTOGRAPHS which, it is hoped, will help explain some of the mystery of the sun's "zodiacal light," are the principal item on the program of an expedition from Brown University to South America to observe a total eclipse of the sun on October 1.

The expedition, co-sponsored by the Skyscrapers, amateur astronomical society of Providence, R. I., will be headed by Dr. Charles H. Smiley, chairman of the Department of Astronomy at Brown, and director of the Ladd Observatory. They intend to set up their high-speed cameras at Quixeramobim, Brazil, on the eastern shoulder of South America, about 100 miles northwest of Recife (formerly Pernambuco). At this location the moon will hide the sun about 10:00 a.m., (Recife time) for nearly five minutes.

The zodiacal light is seen, in the west after sunset or in the east before sunrise, as a wedge or cone of light extending along the ecliptic, the line in which the sun seems to move around the sky during the year. Best seen in the tropics, it is occasionally visible in North America, and is considerably brighter than the most brilliant parts of the Milky Way. Astronomers believe it is caused by reflection of sunlight by myriads of tiny particles arranged in a disc around the sun, and extending out well beyond the orbit of the earth.

Three astronomers have reported seeing it during eclipses, and photographs made by Dr. Smiley from the Peruvian Andes during the eclipse of June 8, 1937, showed a similar effect. However, doubt has been expressed that the sky at an eclipse ever gets dark enough for it to appear. Dr. W. H. Steavenson, an English astronomer, recently said in speaking before the British Astronomical Association:

"I have seen both the Zodiacal Light and a total eclipse separately, and I am sure that the Zodiacal Light would be quite invisible under such conditions, as the sky never gets nearly dark enough."

Dr. Smiley hopes to verify his findings of 1937, and to obtain better and more convincing photographs on his 1940 expedition. He will be accompanied by Mrs. Smiley and Arthur A. Hoag, a junior at the University. They anticipate good weather conditions, for it seldom rains or even is cloudy at Quixeramobim in October. They will leave here August 15. On account of disruption of steamer routes by the war, they may have to go first to Rio de Janeiro, then retrace their route along the Brazilian coast, by land, air or water, to their destination.

Science News Letter, July 13, 1940

STANDARDS

Propose New Definition For Temperature Scales

ONE of the most fundamental standards of science and industry, the temperature scale, will have a new definition if suggestions now being put forth are adopted.

Now the essential points on thermometers, whether they be the familiar ones filled with mercury or colored alcohol or the more precise electrical and gas kinds used for greater temperature ranges and more exact measurements, are set by temperature of melting ice (0 degrees Centigrade and 32 degrees Fahrenheit) and the temperature of steam (100 degrees C. and 212 degrees F.).

Under the suggested change only the ice point would be standard and the steam point would be determined experimentally, just as the boiling points of liquids other than water are now determined. Actually the difference between the two systems would be very small indeed, but the change would (1) improve the accuracy of temperature determinations, (2) fix by definition the values of the constants for converting ordinary Centigrade and Fahrenheit temperatures to Absolute temperatures, and (3) the change would eliminate revisions of previously determined temperatures as new determinations are made of fundamental coefficients of thermometric gases.

The possibility of the new standard was foreseen by the famous English physicists, Joule and Thomson, later Lord Kelvin, in 1854 when standards of the present temperature scale were being set. They recognized that when the temperature of the ice point became known sufficiently accurately, it would be desirable to use it alone to fix the scale. This time is believed to have arrived.

Dr. F. G. Brickwedde, chairman of the Committee on Low Temperature Scales of the National Research Council, points out (*Journal of Applied Physics*, June) that the definition of the temperature scale now in use is the result of an evolution and that it will continue to be changed to meet demands for greater accuracy and precision in the measurement of temperatures. Dr. W. F. Giauque of the University of California has proposed that steps be taken to bring about the adoption of the suggested change.

Science News Letter, July 13, 1940

ARCHAEOLOGY

Old Panama Graveyard Reveals Ornamented Chief

BEDECKED in exquisite golden ornaments, surrounded in death by his wives and slaves offered up as human sacrifices, the remains of a high Indian official or chief of pre-Columbian Panama have been unearthed in a vegetation-covered graveyard on a Coclé province plantation.

This important burial of an American leader who ruled his part of the world some time between 1300 and 1500 A.D., was discovered by an expedition of the University of Pennsylvania's University Museum.

In his first revelations of the discovery, Dr. J. Alden Mason, of the museum's staff, leader of the expedition, stated that the chief was buried in a large, bowl-shaped pit 11 feet deep. In this, mourners laid the resplendant chief decked in gold and surrounded by more shining gifts.

Outstanding were five golden plaques big as dinner plates, believed to have

AN AMERICAN "TUT"

Recalling beauty and glitter of the Egyptian Tutankhamen's burial gifts, the golden burial of an Indian chief has been found in Panama. Shown here as it appeared when first uncovered by archaeologists, it reveals gold medallions, at top, probably from the headdress, ornamented gold plaques worn on the chest, a gold crocodile pendant set with an emerald, gold cuffs, a bead girdle, and many earrods.

been sewed on the front of his war costume. There were also smaller gold plaques, gold cuffs and anklets, ear clips, bells, and beads.

A pendant which Dr. Mason calls "one of the most beautiful and extraordinary gold objects found in America" was on his breast, and it gleamed with an emerald an inch in diameter. The emerald, however, is less interesting than beauty of the goldwork, being pronounced of no great commercial value. Interesting also are earrods, which telescope curtain-rod fashion.

From thick layers of broken pottery, Dr. Mason concludes that those present must have danced or trampled clay dishes into the grave in some ancient and forgotten rite. A crocodile god was worshipped by these Indians, and went to war with them in decorative symbols on the chief's regalia.

Only a small part of the cemetery, which is believed to cover four or five acres, has thus far been excavated. A trench dug by the archaeologists encountered about 30 graves containing hundreds of pottery vessels, and skeletons so fragile from the long-soaking in rainy seasons that they could not be preserved for study. Digging the big graves must have been a tremendous task, Dr. Mason says, for people with no iron tools.

What Indian people these were, in a region 100 miles west of Panama City, is not yet learned. They are unlike the famous Mayas or Aztecs and are believed to have had South, rather than North, American culture.

The expedition was undertaken with permission of the Panama government, which will place a share of the discoveries in its national museum.

Science News Letter, July 13, 1940

PHYTOPATHOLOGY

New Method Aids Search For Elms With Dutch Disease

A NEW and cheaper method used in the search for trees afflicted with Dutch elm disease is described by W. E. Ahrens of the U. S. Department of Agriculture. (*Phytopathology*) It has the further advantage of being usuable at any time of year, instead of only when the trees are in leaf, as at present.

Mr. Ahren's method depends on the fact that Dutch elm disease causes a marked discoloration of considerable areas in the sapwood, just beneath the bark. Samples of this wood, to a depth of from two to five annual rings, are obtained by driving in a half-inch hollow punch at six-inch intervals all around the trunk. The small wounds thus made are protected against other infections by squirting in a little paint, from a pump-type oilcan.

The thin disks of wood are clipped in two, and if any of them show the discoloration symptom they are taken to the laboratory, where cultures are made to show if the deadly fungus is present.

A high percentage of dependability is claimed for the new method.

Science News Letter, July 13, 1940

RESOURCES

Collection of Scrap Metals Enforced by Death Penalty

WITH a death penalty to enforce it, the German government is now gathering articles made of copper, brass, tin, bronze, nickel, lead and other heavy non-ferrous metals, the U. S. Bureau of Mines has learned from diplomatic representatives in the Reich. Zinc, however, is expressly excluded because the domestic production has greatly increased in recent years. Part of this has been due to the acquisition of extensive zinc mines in Polish Upper Silesia. Neither are light metals, such as aluminum and magnesium, nor precious metals, desired.

Another decree has enabled the government to requisition, for the lead they contain, all storage batteries from automobiles not in regular use, especially those from private motor cars. These have suffered enforced idleness for some time in order to conserve gasoline. Prices paid vary from .90 mark (36 cents) for a 6-volt 50-ampere battery to 6.40 marks ($2.56) for one of 12 volts 150 amperes.

Though the German government emphasizes that the campaign is not to be construed as evidence of any dangerous shortage of these metals, officials here believe that even with conquered territory they will still have difficulty in acquiring ample supplies. All German tin has been obtained from overseas countries. The chief European source of nickel has been northern Finland, which also supplied copper. Yugoslavia and Norway have also furnished copper, but it is doubtful whether these countries can supply enough to offset the reduced supply from abroad.

The decree announcing the death penalty to enforce the collection, signed by General Goering, is as follows:

"The collection of metals represents a sacrifice by the German people for the endurance of the war forced upon them.

"Whoever enriches himself by means of these metals, which have been collected or are destined for collection, or

who diverts them from their proper use, does injury to the great German struggle for freedom, and will therefore be punished with death.

"This decree enters into force with its promulgation over the radio. It applies also in the incorporated eastern areas."

Science News Letter, July 13, 1940

INVENTION—RESOURCES

Asks Tin Can Substitutes To Lighten Weight of Rations

With No Need To Worry Over Sufficient Food for Chow, War Department Has Concern Over Transportation

INTENSIFIED efforts to find new substitutes for tin in packing foods may result from Assistant Secretary of War Louis Johnson's appeal to the Institute of Food Technologists to help reduce weight of army supplies.

The U. S. Army would like to lessen the weight of a soldier's daily rations in the field, which total five pounds of "chow" plus a pound and a quarter of tin, cardboard, and wood packing. With no need to worry over sufficient food for our soldiers, or for allies whom we might have to ration in defending the hemisphere, the War Department nevertheless does express concern over transporting and processing the food.

Asking food technologists to help develop containers from substances other than tin, Mr. Johnson said: "Every ounce saved in transportation might prove invaluable when men and guns move to the front."

An especial need: the Army's commissariat would like invented flexible moisture-proof containers rugged enough to ship rice, sugar, and beans to soldiers in the field.

Besides solving a transport problem, if the Quartermaster Corps can get along using less tin, it will be helping to raise the nation's stockpile of this strategic material. Mr. Johnson has not forgotten the estimate that tin cans used by the U.S. Army in World War days would have paved a road from Hoboken to Berlin. This country came close to severe shortages several times.

Now, very differently, the War Department cautiously takes into account this hazard:

"In time of war, access to the raw material may be denied us."

By present reassuring reports, plenty of tin is coming to the United States. Netherlands East Indies, supplying about 6% to 10% of our tin, British Malaya, supplying 75%, are sending shipments right along. But the status of British and Dutch colonies and freedom of the long Pacific shipping lanes are uncertainties which cannot wisely be ignored.

The United States has had tin on its mind for months, for it is a material of which we produce almost none—less than 200 tons a year out of a consumption of 50,000 or more tons. Nearly half the world's output we use.

When war broke out, tin stocks in this country would not have supplied a month's normal requirements. Since then, putting tin on the reserve stockpile list, government purchasing agents have been buying for national security.

That an industrial nation can get along with very little tin, if it must, was demonstrated by Germany in the World War. But it is hard experience. Substitutes partially fill the bill, require much re-tooling and revision of machinery.

Besides the invaluable stockpile for defense, the United States has various "strings to its bow," in the event that tin imports from the Far East should be interrupted.

One possible source of tin is Bolivia, only country on our side of the world to mine tin in important quantities. Bolivia's production quota, set by the International Tin Committee, is the impressively high figure of about 46,000 tons a year, which is, interestingly, very near the amount we have been using.

Actually, however, Bolivia has not been producing up to its quota, due to a variety of handicaps, including the refractory ore, lack of cheap fuel, lack of smelters. Bolivian concentrates have mainly gone overseas to Britain for smelting. As to whether Bolivia's tin industry is expanding to a more productive future, or whether the best of the tin has been mined, reports differ. Some tin is there, certainly, and it is on this side of the world.

Research in packaging, which has already introduced jackets of parchment, rubberized paper, aluminum foil, glass, and other materials, would gain in importance, should it become necessary to release tin to the Army and Navy's greatest industrial needs.

Twelve billion tin containers are the present annual American supply, about 60% being used for packing food and the rest for commodities ranging from moth balls to aspirin. Tin cans and containers are the chief form that tinplate takes.

Reclaiming tin from old cans is another tin-saving possibility, which might be tried on a large scale if it ever became economically worth while. At present prices of tin, it is not considered worth extensive salvage.

Tin substitutes, much discussed, have been put to some specific industrial uses. Tin is tin, and thus far nothing duplicating its broad usefulness has been evolved. But such developments are reported as use of a lead bearing metal, tin free, in producing certain automobiles. Use of enamels and materials such as silver and aluminum in can linings has some possibilities.

Peacetime development of substitutes for our deficient raw materials has been advocated for some time by government mineral experts. They have emphasized that tin is too useful for industry to be deprived of it in peacetime merely as a precaution. And they have placed considerable reliance in the stockpile. But they have advocated seeking substitutes, emphasizing that such substitutes to be worth using should cost less or give better performance.

Science News Letter, July 13, 1940

The largest *census* in history will be taken in 1941 when India's people—probably 400,000,000—will be counted.

Replacing explosives in *coal mining*, a new process pumps oil into an expansible tube in a drilled hole, and when the pressure expands the tube, the coal is rapidly broken into large lumps along its natural parting line.

● RADIO

P. C. Sandretto, superintendent of the Communications Research Laboratory of United Air Lines, will describe the "Visual Highways of the Air" as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, July 18, 4:00 p.m., EDST, 3:00 EST, 2:00 CST, 1:00 MST, 12:00 PST.

Listen in on your local station. Listen in each Thursday.

BOTANY

Corn Roots Nearest Plant Absorb Water Best

CORN roots push themselves deep and far through the soil, yet the ones that are nearest the parent plant are most efficient in absorbing water.

This has been demonstrated in experiments at Tucson, Ariz., by Dr. Charles H. Davis of the University of Arizona. Dr. Davis grew young corn plants in boxes of soil which permitted the development of a four-foot spread of roots, each box provided with one glass side, so that the roots could be accurately counted and measured.

Measurements of soil moisture, taken every four inches along the length of the boxes, showed that roots nearest the plants absorbed water faster than did longer roots pushing out to greater distances. Not only that, but the shorter roots were able to extract water from soil dried to a point at which the plants theoretically should have wilted, and at which they actually did wilt when the roots farther out had to attempt the task of extracting water a little later on.

Dr. Davis' experiments will be reported in detail in the *Botanical Gazette* (June).

Science News Letter, July 13, 1940

INVENTION

Resin From Cashew Nuts Among New Inventions

TWO, AT LEAST, of 851 patents granted recently by the United States Patent Office are for war implements. To Michael Watter, of Baltimore, is granted patent 2,203,345, for a gun turret to be used on an airplane. It is essentially a ball and socket device, made out of a transparent plastic. The ball part, which moves so that the gun can quickly be pointed in any direction, is mounted in a transparent section of the plane's covering, so that the gunner has an entirely clear view. Yet the opening is sealed, and no air can enter through the gun opening.

John Hines, of Astoria, Long Island, and Louis Segal, of New York City, were granted patent 2,203,640, for an improved hand grenade.

The shells of cashew nuts may be used to give a useful resin, by using the method of three North Tonawanda, N. Y., inventors, Alvin F. Shepard, Joseph F. Boiney and Lothar Sontag. The resin is produced by a heating process applied to the oil extracted from the shells. This was granted patent 2,203,206.

Two different inventors received patents for applications of the fountain pen idea; one to a brush, the other to a soldering iron. The former, granted patent 2,203,361, is the invention of Thelma F. E. Pound, of Ellensburg, Wash. A supply of some liquid, which might be applied by the brush, is contained in the handle, and there is an electric element to heat the liquid.

Thomas J. Hallwood, of Columbus, Ohio, invented the soldering iron, and was granted patent 2,203,299. This also is electrically heated. The solder is admitted through the handle, a heating element melts it, and it flows out through a hole in the iron's point.

A device that will produce echo effects, on a radio program, for instance, is a product of the ingenuity of Peter C. Goldmark, of New York City, recipient of patent 2,203,352. Connected to the circuit from the microphone current is a glow lamp which varies in brightness with the sounds. The light from the lamp is focussed on a turning drum covered with a phosphorescent material. This has the property of glowing for a time after a light shining upon it has been shut off.

Thus, the surface of the drum briefly assumes a pattern of light and dark corresponding to the sound waves. Over another part of the drum there is a scanning system where an electric eye watches the light and dark areas converting them back into electrical energy, and this in turn is fed into the microphone circuit. When the varying currents are reconverted into sound, there is the original and then the echo, produced from the phosphorescent drum. By varying the speed of the drum, the lag of the echo may be changed. When any part of the drum has turned completely, the glowing has faded, and it is ready to record again.

Two novel inventions were a falseface and an illuminated hat. The first has flexible pouches, connected to a mouthpiece, so that the wearer can inflate various parts at will, making his nose, cheeks, etc., apparently swell to large proportions. This won patent 2,203,562 for George L. Edwards, of Fuquay Springs, N. C.

The illuminated hat, for which patent 2,203,028 was issued to Louis W. Parrillo, of New York City, has a switch at the wearer's forehead. When he wrinkles his brow, the light is turned on.

Science News Letter, July 13, 1940

IN SCIEN

ICHTHYOLOGY

Fisherman Sets Record With Broadbill Swordfish

WITH the catching of two rare broadbill swordfish in a single day, a feat he has performed twice before, Michael Lerner, head of the American Museum of Natural History's Fifth Big Game Fish Expedition, has set a new record. Since the first was captured in 1913, less than 300 of these fish have been caught by sportsmen in the entire world. Only three others have caught two in one day.

Mr. Lerner's expedition has been operating for the past three months off the coast of Peru and Chile, to determine if the swordfish and marlin found there are the same as those found near New Zealand and Australia, where studies were made last year.

Science News Letter, July 13, 1940

ORNITHOLOGY

Nine-Inch Bird Has Three-Foot Tail

THE LONGEST-TAILED bird for its size ever found is a new bird-of-paradise species newly added to the collections of the Australian Museum, Sydney. The bird, which trails a three-foot tail after a nine-inch body, was collected in New Guinea by J. L. Taylor and J. R. Black, leaders of the recent Hagen-Sepik patrol.

The long tail, which grows only on the male bird, consists mainly of two ribbon-like white plumes. The body and wings are brown, with metallic green throat and head. At the upper base of the bill there is a large tuft of velvety feathers shot with green, while a fiery copper band runs across the chest. The female is reported to be a plain brown bird.

Like all its tribe, this new bird-of-paradise concentrates its beauty in its feathers. Its voice is described as a clicking or hammering noise, like a riveter at work.

It has been given the name McNicholl's ribbon-tailed bird-of-paradise, after Sir Walter McNicholl, Administrator of New Guinea.

Science News Letter, July 13, 1940

NE FIELDS

PHYSICS

Articles for Sale Now Shown in Three Dimensions

BATHING SUITS and other things for sale, as well as scenes of geographical and scientific interest or personal photographs, can be shown in three dimensions upon the screen through use of a commercially available projector. Photographs in either black and white or color are taken with stereoscopic camera. Projector uses differently polarized light in throwing upon the screen the two images. The eyes of the audience, looking through differently oriented polaroid glasses, see the pictures on the screen in such a way that the illusion of three-dimensional depth is created. Like a machine gun the new projector is loaded with 35 slides. A punch of a botton by the lecturer brings a new scene to view. (Manufacturer: Three Dimension Corporation, New Holstein, Wisconsin).

Science News Letter, July 13, 1940

GEOLOGY

Ordinary Earth Minerals To Yield New Materials

THE MANUFACTURE of useful synthetic substances from common minerals in the crust of the earth promises to be among the most useful technologic accomplishments of the future.

The synthetic organic chemicals industry has poured out in recent years drugs, dyes, perfumes and other chemical products by the thousands, made largely from the complexity of coal's molecules. Far less complex substances, such as clay, graphite, etc., are due to come into the technologic limelight.

Most exciting, perhaps, is the possibility of making artificial diamonds of industrial usefulness from graphite by the use of high pressures combined with high temperatures. Both the diamond and graphite consist of the single element, carbon. Found only in unusual localities in the earth's crust where in past ages conditions of heat and pressure have been right to result in their formation, diamonds are potentially much more useful technologically than they are as jewelry.

The extreme hardness of diamonds causes them to be used in drills and for cutting operations, despite their cost. Diamonds used for these purposes are usually black or dark in color, not the flashing white of those used to adorn fair ladies.

If diamonds could be made synthetically at a reasonable cost, they would find wider use than they do in working metals, drilling and other such tasks. As a matter of fact, years ago artificial diamonds were made for practical use.

The new hope for artificial diamonds comes as a result of extremely high pressures achieved at both Harvard and the Carnegie Institution's Geophysical Laboratory, in the neighborhood of 3,000,000 pounds per square inch. One of the experiments made at Harvard was the application of this pressure to graphite in the hope that pressure alone would make the change from graphite to diamond. The attempt was not successful. When high temperature is combined with high pressure, the result may be different. (See SNL, March 9)

From clay there has been made through research at the Massachusetts Institute of Technology a synthetic mica that potentially makes America independent of the supplies of mica from Madagascar that might be interrupted by war conditions. Clay and mica are closely related in chemical composition, silicon, aluminum and oxygen being their chief constituents. Clay is pressed out into a sheet, which is hard and brittle. If this untreated sheet is placed in water, it swells as clay will. But if it is first treated with a lead salt, the lead enters into combination with the atoms of the clay sheet in such a way that it keeps out any other substances, such as water, that come along. A synthetic mica is formed. (See SNL, July 22, 1939)

This substance, called Alsifilm, is being manufactured by five companies already and is finding extensive use as an insulator in all sorts of products, among which are electric toasters for your table.

Research may be expected to find similar ways of treating other common inorganic minerals in order to produce substitutes for existing materials or substances with new combinations of properties fit for new uses. As in the case of the synthetic mica, many of these new developments will be worked out from the theoretical chemistry of the substances involved. By learning how the atoms are arranged, science is able to design new substances and then attempt to build them in the laboratory.

Science News Letter, July 13, 1940

AGRICULTURE

Invasion Won't Damage American Cattle Industry

IF GERMAN invasion of the little cattle-raising Islands of Jersey and Guernsey off the French coast should cut off completely United States importation of Jersey and Guernsey cattle, it would have no important effect on the cattle industry of this country, in the opinion of experts here.

We already have in the United States 237,430 registered Guernseys and 252,811 registered Jerseys. These are the pure bred cattle, both of whose parents were registered pure breeds. In addition there is a much larger number of those known as "grades" which are the Jersey or Guernsey strain, but which are not eligible for registration. Of these there are 3,700,000 Guernseys and 10,000,000 Jerseys.

Since there were probably not more than about 20,000 Jersey cattle on the Island of Jersey before the war, the cutting off this source of supply will not materially damage our supply of this breed.

Imports of Guernseys have totaled only 52 in the last decade, and we have brought in from Jersey only 1,749 head—all registered cattle. The last importation was only about six weeks ago.

Science News Letter, July 13, 1940

GENERAL SCIENCE

Sigma Xi Headquarters Is Moving to Yale

SIGMA Xi, the national honor society promoting research, is moving its headquarters to Yale University after having maintained them at Union College, Schenectady, N. Y., for more than 18 years.

At the same time Dean Edward Ellery of Union College becomes national president after having been national secretary since 1922. Dr. George A. Baitsell, Yale professor of biology, becomes national secretary after a term as national president.

During Dean Ellery's long administration of Sigma Xi the membership has grown from 15,000 to 40,000 and the active chapters in universities and colleges have risen from 36 to 80. Dean Ellery this year retired from the Union College and during the next two years will continue to devote himself to the upbuilding of Sigma Xi.

Science News Letter, July 13, 1940

PSYCHOLOGY

The Wolf-Girls and the Baboon-Boy

Scientists Study With Interest Reports of Children Said To Have Been Brought Up By Animals in the Wild

By LOIS MATTOX MILLER

FROM Romulus and Remus, mythical founders of Rome, through Kipling's Mowgli to Tarzan, stories of human babies adopted by wolves, bears, or apes, and reared to super-manhood far from human society have fascinated people of all ages in all climes. Scientists, always sceptical of the unauthenticated, have nevertheless searched for evidence of weird reality behind so persistent a myth pattern. Ever since ancient Rome, reports have circulated of actual "wild children," half-beast and half-human, inhabiting the caves and prowling through the forests of Europe, Africa, and Asia. Such tales, when they could be tracked down at all, usually turned out to be cases of abandoned waifs, some with subnormal intelligence, but without conclusive evidence of animal foster-parentage.

But now, for the first time, science has evidence of two cases of humans who may have been reared by wild animals: the tragic Wolf-children of Midnapore; and Lucas, the Baboon Boy of South Africa.

Reported By Missionary

The Rev. J. L. Singh, a native Christian missionary who supported, out of his own poor pocket, an orphanage at Midnapore, India, was besought by the natives of a nearby village to rid them of the "man ghost" who inhabited a giant ant-hill on the borderlands. To satisfy his converts, Rev. Singh organized a small party, including several British residents, and set up a watch over the ant-hill at nightfall on October 9, 1920. Suddenly, in the twilight, they saw two full-grown wolves emerge from the tunnel, followed by a third wolf and two cubs. Close on the heels of the cubs, says the Rev. Mr. Singh, came a "hideous looking little creature—hand, foot and body like a human," followed by a similar creature even smaller in size. "Their eyes were bright and piercing, unlike human eyes," he says. "Yet I at once came to the conclusion that these were children."

The wolf-den was excavated a week later. Two male wolves escaped across the fields, but the she-wolf defended the lair so viciously that she had to be killed. Huddled in one corner of the den, "all four clutching together in a 'monkey-ball,'" the Rev. Singh found the two cubs and two children—both girls, one seemingly about eight years old, the other about a year and a half. The children were more ferocious than the cubs. They had to be bound up in sheets to be taken to the mission-orphanage in Midnapore.

The skill, understanding, and unending patience with which the India missionary and his wife sought to restore these strange wolf-children to the ways of human life have since won general applause. The task presented insuperable difficulties. The habits of Kamala and Amala, as the Singhs named them, were animal rather than human. They would tolerate no clothing on their bodies. Long matted hair fell below the shoulders; their jaws were reported to have had a strange wolf-like formation; their teeth were sharp and pointed, and the interior of their mouths animal-like. They would eat no vegetable food, but could scent raw meat at a long distance. They were incapable of standing erect, but could move on all fours with amazing speed. They slept or drowsed through the day, but were wide awake, unafraid, and eager to prowl at night. They disliked and avoided human society and sought the company of the dogs, kids and goats on the mission farm. Strangely, the animals sought out the children and were friendly and without fear.

Died of Nephritis

Very slowly at first, with Amala, the younger child, always leading the way, the girls began to respond to the kindness and affection of Mrs. Singh, who fed and nursed them, patiently massaging their bodies and legs and giving them exercises which she hoped would teach them to walk erect. Still more animal than human, they seemed to be making progress when, eleven months after their discovery in the wolf-den, Amala succumbed to an illness diagnosed as "nephritis and general edema."

At Amala's death, the older girl was seen to shed one tear—her first sign of human emotion. For weeks she lingered over the places where Amala had sat and slept, sniffing anxiously like a dog, and uttering a strange cry that was neither animal nor human. Amala, the younger child, had been the leader in the difficult adjustment to human environment; and for Kamala this loss of her "sister" became a serious setback.

Then Kamala drew closer to Mrs. Singh, and gradually began to take some interest in the other children in the nursery. She ceased to wolf her food by putting her head to the plate; and learned to use a cup instead of lapping up liquids. She developed a vocabulary of about 40 words, always imperfectly enunciated. She not only accepted clothing, but demanded her "fok" (frock) when leaving the house or appearing before strangers. With amazing patience, Mrs. Singh taught Kamala to stand erect and use her two legs for walking. Her gait was slow and unsteady, and for running she always returned to all fours. When she ran thus, it was difficult for anyone to overtake her.

Became Lovable and Affectionate

After nine years in human environment, Kamala lost most of her animal traits, and showed signs of developing into a lovable, affectionate, and obedient child. She was a favorite in the orphanage. Then she fell ill of the same illness that had caused Amala's death. She died on November 14, 1929, and was buried beside Amala in the churchyard of St. John's Church at Midnapore.

Dr. S. P. Sarbadhicari, the physician who attended both children, writes:

"There was great difficulty in feeding the poor wolf-girls anything but meat and milk. If they could have been induced to take proper mixed diet with properly balanced vitamins, improvement would have been more marked and they could have returned to an ordinary human condition from the stage of animal."

The remarkable record of the Wolf-children which the Rev. Singh kept in his diary has been studied by a number of distinguished scientists, including Professor R. Ruggles Gates, University of London, and Professor Arnold Gesell, Yale Clinic of Child Development. It is now being prepared for publication by Professor Robert M. Zingg, University of Denver, and the entire proceeds are to

go to the support of the impoverished mission-orphanage where Amala and Kamala spent their brief time in human society.

"The career of Kamala, even though cut short," writes Professor Gesell, "demonstrates anew the stamina of the human spirit. The events have a poignant significance for anyone who is interested in the nature and growth of the human mind."

The "Baboon Boy"

Lucas, the Baboon Boy, still survives on a farm in South Africa, a strange, childish man nearly 50 years old. According to report, the officers of the old Cape Mounted Police, Lance Sergeant Charles Holsen and Sergeant J. P. Venter, were riding through the wild regions of the South East Cape some 40 years ago when they came upon a troop of young baboons playing together in a clearing. For the sport of it, one officer fired a shot into the group and the apes scattered, all except one who lingered behind. Fearful that they had wounded it, the officers rode into the clearing and overtook the creature. It proved to be a fully developed native boy, who chattered like an ape and jumped about on all fours.

The police canvassed the native villages of the district, but found no reports of a missing child, and no one who could identify the baboon boy. He was then taken to a mental hospital.

A half-breed boy was received at the Mental Hospital at Grahamstown, where he was entered March 30, 1904. The doctors found him suffering from acute mania. His father and mother were unknown, but no mention of baboons occurs in the hospital records. He was said to be extremely mischievous and "full of monkey tricks." He knew no human speech, and refused all food except raw corn and cactus and has been seen to eat 89 prickly pears in one sitting. Physically, he was emaciated and had had a fracture of the skull.

He was finally discharged into the custody of George H. Smith whose brother was on the hospital staff and who owned Thornhill Farm, Shaw Park. There Lucas—as Mr. Smith named him —resides to this day. He has become a useful worker on the farm, but has to be called to each specific task each time.

Lucas' story was spread by word of mouth for years before Professor Raymond A. Dart, University of Witwatersrand, Johannesburg, began a serious investigation.

His protector, Mr. Smith, is quoted in a letter from a reporter of the Johannesburg Star as saying: "His profile, mannerisms, long arms and abnormal development of the haunches, the constant jerking and nodding of the head, the scratching of parts of the body with the index finger, and his peculiar, frightened-looking grin, all tell their tale of his early association with the baboons."

PLAYMATES

Little Donald Kellogg keeps in perfect step with his ape playmate Gua, who learned to wear human clothes and do the things a human baby does in an experiment conducted by Donald's psychologist father, Dr. W. N. Kellogg, in 1931.

Smith believed that Lucas had been stolen by baboons as a young baby. When captured, he knew no language. Years later, when he had learned a few words of English, Lucas told how he and the baboons had raided ostrich nests and stolen eggs. He pointed to the scar on his head and said it was caused by the kick he had received from one outraged ostrich.

Professor Dart's investigation stirred considerable interest in scientific circles. "To me there seems nothing miraculous or improbable in it," said one investigator of Lucas' story. "Any nursing female baboon might find it convenient, or at least instinct, to steal a suckling animal so closely resembling her own . . . The part to be cleared up is the part played by the police."

Unfortunately, Lance Sergeant Holsen and Venter were dead. But several of their contemporaries on the force made affidavits that they had heard the story from Holsen's own lips, and Constable W. J. Coetzer declared: "Holsen and Sergeant J. P. Venter certainly were not the sort of people to make up a yarn." Lucas' own affidavit states: "I can recall only a few incidents of my life amongst the baboons. My food consisted mainly of crickets, ostrich eggs, prickly pears, and wild honey . . . I was hunting for food one day with my baboon companions when two policemen shot at us with revolvers. I tried very hard to escape, but I was captured and carried away on a horse by one of the policemen."

The records of the Grahamstown Mental Hospital mention one "Kafir boy approximately 13 years of age" admitted as an "indoor pauper". Nothing was known of him or his people, but the cause of admission was listed as "injury to the head." The record noted: "Foolish and nervous manner. He is destructive to his clothes and dirty in his habits. Laughs without cause and tries to stand on his head." There is no mention of the baboon background. The hospital is a considerable distance from the spot where the "Baboon Boy" was reported found.

Dr. J. A. van Heerden of the Grahamstown Hospital visited Lucas on November 29, 1939, and reported:

"His demeanor is silly and childish. He is clumsy and ungainly in all muscular movements. He has a poor vocabulary in English but is able to express himself fairly well. He is reminiscent and

appears to have a compulsion to relate how he acquired the scar on his cranium. He uses the expression, 'Koelie kicked me.'"

Dr. Dru Drury, of Grahamstown, who went with Dr. van Heerden to examine Lucas, concluded that Lucas was a normal half-breed boy until his brain was damaged by an accident which fractured his skull in childhood.

So much for the documented recent cases; there are plenty of older stories where some facts are known. Sir William Sleeman, governor at Lucknow, India, in the 1850's, recorded that "hundreds" of children were carried off by wolves in his time, and that he heard of six cases which he regarded as reasonably well-established in which the children lived with their animal foster-parents. He told of a little boy captured in a raid on a wolf den at Sultanpoor who lived three years in captivity, but remained always savage and filthy, his only affection being spent on a mongrel dog. He would eat nothing but raw meat, would wear no clothing and snarled at children, though he seemed afraid of grown-ups. At his death, he uttered the only words he was ever heard to speak. He put his hands to his head and said, "It hurts."

Another boy, captured with wolves and brought into Rondee, had to be tied to a tent-stake for about four months, but after that began to understand and obey signs, and learned to perform small services, like preparing and lighting a hookah. He learned to pronounce one word—the name of a little Cashmir girl who was kind to him. Wolves were seen to approach and play with him at night. Eventually, he escaped and never was seen again.

Wild Boy of Aveyron

Itard, a famous pioneer psychologist and educator, tried for five years to teach human ways to a boy found when he was about 11 years old, naked and running wild in the forest in the Department of Aveyron, France, in 1795. He refused to wear clothes, curled himself into a ball to sleep, was strong, quick and flew into rages. He learned little, though eventually he was taught to eat cooked food. He died, still sub-normal by human standards, when he was about 40.

"Wild Peter" was described by Linnaeus, the great Swedish pioneer in science. "Wild Peter" was a boy found at "hay-making time" in 1724 near Hameln, Germany, and decoyed into captivity by offering him apples. Taken to England, King George I saw him in 1726 and had him turned over to the Princess of Wales, later Queen Caroline. He died in 1785 in the home of a tenant farmer in Herfordshire. He never learned to speak, and liked best as diet the bark of green twigs. He chewed grass, cabbage, and bean plants merely to get the juices. Swift, Buffon and others studied him. He was good-natured, unlike most of the wild-reared children. "But," remarked a scientist of that day, "laughter, which is the particular gift of mankind, was never heard from him."

There comes down to us also, in Latin, an account of a wolf boy of about seven captured by hunters in Hesse, in 1344. He was taught to walk and to talk, and related dim memories of being carried off by wolves when, as he later guessed, he was about three years old. He was brought to the court of the Landgraf as a great curiosity.

Seek Light on Environment

These old records make it certain that strange, half-wild children had actually been found but stories that the children had been reared by animals had always been dismissed by modern research men as the attempts of an unscientific age to explain puzzling phenomena. Now, in the light of the well-established cases of the Midnapore wolf-girls and the living Baboon boy, they are turning back to these old records with renewed interest. To the casual reader, these are just fascinating wonder-tales; but the scientists look to them to throw light on the relative importance of heredity and environment in shaping behavior patterns.

Unfortunately, there is no way of knowing, in the case of any of these wild children just what their mental condition was at birth or before they were deprived of human society.

Perhaps they were feeble-minded or mentally diseased before their life in the wild began. Physicians could probably match much of the peculiar behavior described from their case records of civilized children who are mentally defective. It is not at all uncommon for normal children to run on all fours.

Many idiots tear off clothing and even tear their own flesh unless restrained. Their ways of eating are primitive unless they receive careful and patient training. Their language is likely to resemble animal grunts.

In India it was an ancient custom to expose to wild beasts unwanted babies, particularly girl infants or babies born under an "unlucky star," and this practice may still be followed to some extent in remote places today. So it is entirely possible that the "wild girls" were given up by their parents because they were not attractive babies or because the parents were irresponsible.

Lacking information about the original, hereditary mental equipment of these babies, scientists cannot judge what may have been the effect of the strange environment in which they spent their childhood. And no scientists could think of deliberately exposing a child of known parentage and tested intelligence to such a hazard.

Brought Up Ape With Baby

The greatest light on the subject so far obtained was the result of reversing the experiment when Dr. W. N. Kellogg in 1931 brought an ape baby into his home and brought it up with his own child as if it were a human infant.

Gua, the ape baby, learned to walk upright, to eat with a spoon and drink from a cup. She played with blocks and rolled a ball as did her human playmate. She learned human habits of cleanliness. And, because an ape develops more rapidly than does a human baby, she learned these "human" habits more rapidly than did little Donald who shared the nursery with her. From this experiment, Dr. Kellogg concludes that environment may strikingly modify the habits and mode of living of higher organisms.

Although few of us would like to take the chance of allowing a human baby to play with wolves, scientists would hesitate to declare that the mothering of human infants by female lower animals is impossible. When an animal is preparing for motherhood, building her nest or caring for her own brood of young, she will often adopt the young of other species and will take them in and care for them as though they were her own.

Humans, being very intelligent among animals, would probably adapt to their

BOOKS

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price and we will pay postage in the United States. If price is unknown, send $5 and the change will be returned. When publications are free, send 10c for handling. Address:

Book Department

SCIENCE NEWS LETTER
2101 Constitution Ave.
Washington, D. C.

infra-human environment as well as their physical make-up would permit. They can ape better than the apes. A human child living among apes or wolves would be expected to do as the apes or wolves do. This might indicate high intelligence rather than low.

Science News Letter, July 13, 1940

AERONAUTICS—RADIO

New Rotating Radio Beam Directs Pilot to Fixed Beacon

BY MEANS of a radio beam which sweeps around the horizon 60 times a second, airplane pilots can now find their course to a fixed beacon at all times.

A dial on the instrument board displays a circle of light, around which an indicating mark moves to show the direction of the plane from the beacon.

Dr. David G. C. Luck described the new device to members of the Institute of Radio Engineers at their Boston meeting. It was developed under his supervision in four years of research at the RCA Laboratory at Central Airport, Camden, N. J., and is known as the "omni-directional radio range beacon," and operates on ultra-high-frequency, minimizing the effect of static. It also permits the use of a small, two foot high, antenna, instead of a group of high towers.

Previous radio beacons confine the pilot to a definite course. As long as he is following the course he knows it. If he goes off, he is also informed. But, though he can tell which way he is off, he cannot tell how far he has left the course, nor what direction his destination may be. To provide this information, some air lines have used direction finders on the plane, which show the direction to the beam transmitting station from the plane, but these are not satisfactory in the ultra-high-frequencies.

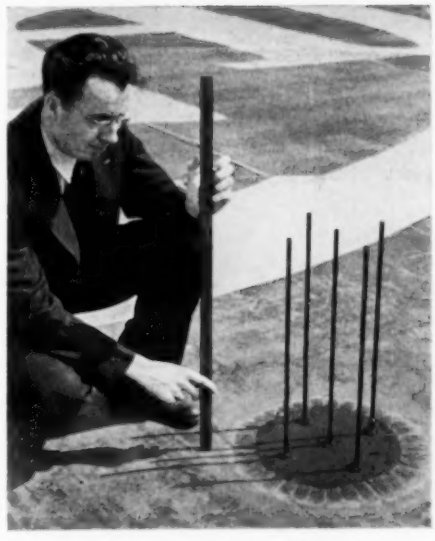
Dr. Luck described the operation of the new system as follows:

"If the pilot must fly around bad weather on his regular course, he can always 'see' his direction from the radio station at a glance. If he wants to fly straight into or out from the beacon, he has only to hold the mark steady at that course against a scale on the instrument face.

"All this works like a lighthouse that sends out two kinds of light, one a beam which sweeps around steadily and the other a flash sent out in all directions just as the beam points north. Time the interval from the flash until the beam sweeps over you, and you know your exact direction from the lighthouse.

"In this new radio range, the radio lighthouse is on the ground and on the plane the indicating instrument automatically times the flash and beam. All this is done electrically, and our lighthouse beam sweeps clear around 60 times each second."

Science News Letter, July 13, 1940



IN SMALL COMPASS

Instead of five 125-foot towers, required for long wave radio range systems now in use, these five two-foot metal rods are all the antennae needed for the new Omni-directional Radio Range Beacon, developed at the RCA research laboratories in Camden.

ARCHAEOLOGY

Blitzkrieg, Secret Weapons Downed Ancient Egypt

IF NAZI Germany continues to repeat the conquering career of the Asiatic Hyksos nearly 1800 years before Christ, civilizations now trampled may expect to rise and fight again, and win. But not very soon.

Citing the Hyksos lesson from history, Dr. John A. Wilson, director of the University of Chicago's Oriental Institute, finds that these Asiatic soldiers of adventure effectively used the modern German formula of secret weapons, launched with blitzkrieg speed and surprise. Turning horses and chariots suddenly into the midst of old-fashioned Egyptian and Babylonian foot soldiers, the Hyksos spread terror and confusion, as the flying chariots wheeled and advanced, and mowed down the unprepared men.

In the peace following conquest, the Hyksos planted impregnable fortresses at strategic points all over the Near East. Controlling channels of trade, they enjoyed wealth, amid the poverty and hunger of the conquered.

However, says Dr. Wilson, their "frightful engines of speed and power, meaning horses and chariots, could not be kept out of Egyptian hands. And Egypt, re-armed, and stiffened by a united spiritual force, smashed the Hyksos confederacy in battle, battered open the supposedly impregnable fortresses and threw the invaders out of Egypt. That did not happen until May 12, 1468 B.C.

The liberated Egyptians then turned to empire-building, themselves. Astutely timing their advance, they advanced toward Hyksos-controlled Palestine and Syria in spring, when their own harvest was in, while the more northerly lands were still being worked by the manpower. Outwitted by this strategy, the people and their food supply were soon at the mercy of the Egyptians.

In a later era, the Egyptian empire fell victim to fifth column tactics, Dr. Wilson shows. Powerful Hittites, living where modern Turkey is now, formed a fifth column among disloyal and discontented Egyptians of upper classes, while the Pharaoh Akhnaton was devoting himself to idealistic religious reforms, ignoring danger trends.

"There were many," says Dr. Wilson, "who took bribes of the Hittites to work

against Egypt and break up the empire, even while writing pharaoh cooing letters of submission."

When the fifth column had bored sufficiently into Egypt, the Hittites marched down, probably armed with a new secret weapon—iron lances and swords—to devastate the still behind-the-times Egyptians, armed merely with bronze. With this force attacking, and with internal troubles of organized rackets, strikes, and plundering bands of roaming soldiers, Egypt collapsed.

Science News Letter, July 13, 1940

AERONAUTICS

Despite War, the English Discuss Civil Aviation

Possibility of Passengers Crossing Atlantic in an Overnight Hop Is Foreseen By London Expert

POSSIBILITY of passengers crossing the Atlantic, between London and New York or Montreal, in an overnight hop, in planes travelling 300 miles an hour, is foreseen by Dr. H. Roxbee Cox, formerly chief technical officer of the Air Registration Board, in a recent address to the Royal Aeronautical Society in London. (*Flight,* June 6)

"There can be no doubt that when a country is fighting for its life, its primary aim is to win the fight," Dr. Cox said, "but it is generally agreed that we are fighting also for our civilization. It would seem axiomatic then, that we must preserve the means of civilization, of which civil aviation is one."

He suggested that safety requirements might be varied depending on the route of the flight. Over cool flat countries, between sea level airports, planes could carry more passengers than when flying over mountains, between high altitude fields in the tropics, he said. In recent years, the British practice has been to set minimum requirements to suit the worst conditions, but this, he stated, is uneconomical.

He called attention to the present transatlantic schedule of Pan American Airways planes, which operate at a speed of 170 miles per hour, making the trip eastward in 29½ hours and westward in 24 hours, allowing for the time difference in England and the United States, and the prevailing westerly winds.

"After this," he declared, "the obvious big step forward would be to make the journey overnight. That we cannot at present consider this is clear from the calculation which shows that, though a westward speed of 240 miles per hour would be adequate, an eastbound speed of 486 miles per hour would be required.

"An approximation to the overnight ideal is possible at 300 miles per hour. This would allow arrival at Southampton at 10 a.m., if departure had been made from Montreal at 6 p.m. the previous day. I suggest, then, that the next big advance in operational speed will be to 300 miles per hour.

"What degree of comfort should be supplied at this speed? The westbound passengers will be on board only 13, the eastbound only 11 hours, and most of this time may be spent in bed. I suggest that weight and space might be more profitably expended in comfortable beds than in promenade decks and wine cellars."

With a daily service, he stated, it would probably not be necessary for some time to cater for more than 250 passengers and 20,000 pounds of mail per week. This would be about 35 passengers per day, but to deal with fluctuations in load, the aircraft would probably need to have room for 50 passengers. He also suggested that it would probably be necessary to make the direct North Atlantic route, now used only in summer, an all year round one.

"There is, therefore, ahead of the operators a highly interesting and perhaps exciting period," the speaker declared.

Science News Letter, July 13, 1940

New *plastic tubes* can shoot light around corners.

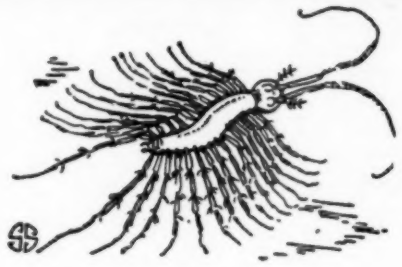
The first self-hardening tool *steel* was produced in 1868.

Barnum's six and one-half ton elephant, *Jumbo,* had a daily ration of 200 pounds of hay, two bushels of oats, a barrel of potatoes, 15 loaves of bread, and several quarts of onions.

ENTOMOLOGY

NATURE RAMBLINGS

by Frank Thone



Unappreciated Arthropod

LATEST contribution to the literature in dispraise of the centipede is a jingle that runs something like this:

I do not like the centipede,
He is a bug we do not need.
He runs from the bathroom through the hall
And up and down the bedroom wall;
You always swat where he is not—
And when you do it leaves a blot.

Just why the poor centipede should be swatted at all, blot or no blot, is not answered. The whole attitude of the average person, and particularly the average housewife, can be summed up in, "Here's a bug. Swat it!"

It matters not that the centipede is not a bug, not even an insect. It matters not that the common house species is completely harmless to man. It crawls and wriggles, and it has too many legs for our mental comfort. So we reach for the swatter.

Actually the centipede does do the householder at least a minor benefit, by preying on flies. Being nocturnal, it does its prowling on the ceiling in the dark hours when flies are suspended by their feet, fast asleep. Stumbling on its victim in the dark, the centipede instantly fangs the fly, sometimes falling to the floor through the vigor of its pounce. But it never lets go of the fly.

Of course, it is a bit disconcerting to find a centipede in your bathtub in the morning, where it has fallen during the night and cannot get out again. For although its clinging feet can easily find upside down footholds on the slight roughness of wallpaper, they are no match for the slippery enamel of plumbing. So all you can do is scoop him out with a piece of paper, usually mangling him beyond recovery in the process.

Centipedes are almost unbelievably

fragile. Their many jointed legs break off at the slightest provocation, and even their slender bodies snap in two on very little handling. It is a good thing (for the centipede) that these legs can be regrown, like the lost legs of spiders, crabs and similar creatures. Incidentally, there are not a hundred legs, as the centipede's name implies. Less than half that number is the more usual quota.

Probably the popular tendency to classify centipedes, along with spiders and scorpions, as insects or "bugs" is beyond correction. Actually, insects, spiders, scorpions, centipedes, millipedes and a few less well known creatures hold equal rank as classes in a great natural group comprising all animals that have jointed legs. This joint-leggedness is reflected in the Greek-derived name that covers the whole lot of them: Arthropoda.

Science News Letter, July 13, 1940

ICHTHYOLOGY

Fish Carry Own Lights In Under-Ocean Blackout

Down in Oceanic Abysses Where No Sunlight Penetrates Are Dimmed Lights Like Those of European Cities

LIFE in a world of perpetual blackout is not necessarily completely lightless and blind, says Prof. E. Newton Harvey of Princeton University. Creatures of the oceanic abysses, where no glimmer of sunlight ever penetrates, carry dim, greenish lights that give their little patches of illumination, very much after the fashion of the carefully shuttered and dimmed lights carried in European cities now that the Dark Age is again upon the earth.

Not only in the ocean's depths but also in our own upper world of air and earth are there nocturnal creatures that light their own dark ways. Almost all the major groups of animals, and two great classes of plants, have representatives in the glimmering ranks reviewed by the Princeton biologist. Bacteria, fungi, protozoa, jellyfish, up to insects, mollusks and fish, all have their lantern-bearers.

Some, like the bacteria, have no way of turning their light on or off and so shine with a constant glow. Most, however, either flash at more or less determinable intervals, like the familiar fireflies, or burst into phosphorescence when disturbed, like the one-celled animals that swarm in the sea during periods when the water "burns" at night.

There are certain forms without "power-plants" of their own that exploit the light-producing powers of smaller creatures, notably bacteria. One remarkable case which Prof. Harvey describes in a new book, *Living Light* (Princeton University Press), is the special bacteria-harboring organ carried by two related genera of tropical fish. Below each eye is an organ apparently especially designed for growing masses of luminous bacteria. It has a rich blood supply, opaque screens for protecting other tissues of the fish from the light, and a mechanism for shuttering the illumination at will.

Not always, however, is the presence of luminous bacteria beneficial to the animal in which they live. There are a number of species of insects and smaller crustacea that become populated with these shining germs, and in most instances such infection is fatal. Luminous wounds in human beings have even been recorded, in days before modern aseptic surgery.

Less serious in its consequences, and with even a humorous touch, was an instance of "borrowed fire" which Prof. Harvey observed in Cuba. He found what at first appeared to be a luminescent frog. Upon closer examination it turned out that the animal had just made a hearty meal of fireflies, which were still shining so strongly that their light came through the skin on the frog's bulging abdomen.

Science News Letter, July 13, 1940

FIGHTS AERIAL INVASION

Aerial invasion of the United States by possible disease-bearing mosquitoes is fought by this new sprayer, developed for the U. S. Public Health Service. The spray is so fine that it is practically dry, that is, it does not deposit on walls and fabrics. It is used on planes in flight to Miami, Florida, from Caribbean and Mexican ports, and very few live mosquitoes have been found since its employment. On the Pacific Coast it is used before departure on planes bound for Hawaii and has proven effective in keeping mosquitoes out of these islands.

Plywood is being made into wall panels as large as 8 by 20 feet.

GETTING ACQUAINTED WITH

RADIO

By ALFRED MORGAN

Unveils the mystery that surrounds radio and clearly presents the basic principles essential to a complete understanding of the subject. Explanatory drawings. $2.50.

D. APPLETON-CENTURY CO.
35 W. 32nd St., New York

First Glances at New Books

PSYCHOLOGY

GETTING MORE OUT OF LIFE—Joseph Jastrow—*Emerson Books,* 312 p., $2. An eminent psychologist writes simply but pointedly for the layman about matters of the utmost importance to the individual.

Science News Letter, July 13, 1940

CHEMISTRY

CHEMISTRY AND YOU, A Textbook for High Schools, 802 p., $1.60; CHEMISTRY AND YOU IN THE LABORATORY, 236 p., 88c.—B. S. Hopkins, R. E. Davis, H. R. Smith, Martin V. McGill and G. M. Bradbury—*Lyons and Carnahan.*

This new chemistry textbook seeks to emphasize chemical principles, generalizations and interesting applications of chemistry rather than minute factual material. The authors believe that the three broad methods of approach will be as good 40 years from now as they are today regardless of what directions actual scientific discoveries may take in that time.

Science News Letter, July 13, 1940

BIOLOGY

NEUROHUMORS AS CHROMATOPHORE ACTIVATORS—G. H. Parker—*Library of the American Academy of Arts and Sciences,* 35 p., $1. (Proceedings of the American Academy of Arts and Sciences, Vol. 73, No. 7, Feb., 1940)

Science News Letter, July 13, 1940

CHEMISTRY

THE TOOLS OF THE CHEMIST, Their Ancestry and American Evolution — Ernest Child—*Reinhold,* 220 p., $3.50. Here is a fascinating story of chemistry as told through the instruments and apparatus which have played such an important role in developing chemistry to its advanced stage of today.

Science News Letter, July 13, 1940

CHEMISTRY

LECTURE DEMONSTRATIONS IN GENERAL CHEMISTRY — Paul Arthur — *McGraw-Hill,* 455 p., $4. This complete laboratory manual for the lecture demonstrator gives full instructions for presenting more than one thousand chemical experiments grouped under 175 topical headings.

Science News Letter, July 13, 1940

PHYSICS

THE PHOTISMI DE LUMINE OF MAUROLYCUS, A Chapter in Late Medieval Optics—Translated from the Latin into English by Henry Crew—*Macmillan,* 134 p., $3. Source material in optics translated from the original publication. A very good book for those who like to own some of the basic historical material in science.

Science News Letter, July 13, 1940

GEOGRAPHY

THE PAN AMERICAN HIGHWAY, From the Rio Grande to the Canal Zone—Harry A. Franck and Herbert C. Lanks—*Appleton-Century,* 249 p., illus., $5. With over 150 photographs by Mr. Lanks to bring Mexican and Central American life and countryside before your eyes, this pictorial text makes the adventure of motoring south appear very attractive. Mr. Frank's text combines useful travel information and picturesque lore.

Science News Letter, July 13, 1940

POLITICAL SCIENCE

INTERNATIONAL BOUNDARIES, A Study of Boundary Functions and Problems—S. Whittemore Boggs—*Columbia Univ. Press,* 272 p., illus., $3.25. Analyzes the whys and wherefores of boundaries, a topic of world concern these days when so many borders are shifting. Mr. Boggs, the State Department's geographer, has produced a valuable book of informative facts.

Science News Letter, July 13, 1940

GEOLOGY

A HANDBOOK OF ROCKS (6th ed.)—James Furman Kemp; rev. and ed. by Frank F. Grout—*Van Nostrand,* 300 p., illus., $3. A new edition of a perennially successful handbook of petrology. Since the death of Prof. Kemp in 1926, the work of revision and rearrangement has been in the hands of Prof. Grout.

Science News Letter, July 13, 1940

HERPETOLOGY

THE RATTLESNAKES, Genera Sistrurus and Crotalus, A Study in Zoogeography and Evolution — Howard K. Gloyd — *Chicago Academy of Sciences,* 266 p., illus., $2.50. Well known though rattlesnakes are, it is not generally realized by the average layman how many and varied are their species. Zoologists know it all too well, and they at least will be very glad to have the difficult taxonomy of the two genera *Crotalus* and *Sistrurus* put in order. The thorough textual treatment will be of great help to the scientific user of this monograph; the good quality of the photographic plates will be useful to the non-professional as well.

Science News Letter, July 13, 1940

PHOTOGRAPHY

KODACHROME AND HOW TO USE IT—Ivan Dmitri—*Simon and Schuster,* 143 p., colored illus., $3.95. In this gorgeous book of color photographs, the principles of color photography are explained and the reader is let in on the secret of how the author and other talented photographers obtain the effects so admired.

Science News Letter, July 13, 1940

PHYSIOLOGY

ELEMENTS OF HUMAN PHYSIOLOGY—Miriam Scott Lucas—*Lea & Febiger,* 400 p., $4.50. A text for college students.

Science News Letter, July 13, 1940

MEDICINE

SEX IN MARRIAGE (2d. ed. Rev.) — Ernest R. Groves and Gladys Hoagland Groves — *Emerson Books,* 250 p., $2. Straightforward advice for the newly married and those about to be married.

Science News Letter, July 13, 1940

MEDICINE

MEDICOLEGAL AND INDUSTRIAL TOXICOLOGY, CRIMINAL INVESTIGATION, OCCUPATIONAL DISEASES—Henry J. Eilmann—*Blakiston,* 324 p., $3. A useful handbook for the coroner, industrial physician, lawyer, insurance adjuster, toxicologist and laboratory expert.

Science News Letter, July 13, 1940

MEDICINE

CONVALESCENT CARE, Proceedings of the Conference Held Under the Auspices of the Committee on Public Health Relations of The New York Academy of Medicine, November 9 and 10, 1939—*New York Academy of Medicine,* 261 p., free upon direct application to New York Acad. of Medicine, 2 East 103 St., New York, N. Y.

Science News Letter, July 13, 1940

MEDICINE

INTRODUCTION TO MEDICINE—Don C. Sutton—*Mosby,* 642 p., $3.25. A text for students of nursing which graduate nurses may find helpful in bringing their medical knowledge up to date.

Science News Letter, July 13, 1940

MEDICINE

MEDICAL MANUAL OF CHEMICAL WARFARE, 1939—Great Britain. War Office—*British Library of Information,* 118 p., 75c. A manual, prepared for medical officers of the British services, which American physicians may find particularly interesting at the present time.

Science News Letter, July 13, 1940